



AMEREN ILLINOIS COMPANY ELECTRIC & GAS RESIDENTIAL AND COMMERCIAL PORTFOLIOS - PY4 INTEGRATED EVALUATION REPORT Final

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TABLE OF CONTENTS

1. EXECUTIVE SUMMARY	3
2. INTRODUCTION	5
2.1 Overview of the AIC Portfolio	5
2.2 PY4 Evaluation Approach	7
3. PORTFOLIO RESULTS.....	10
3.1 Residential Lighting	10
3.2 Residential Behavioral Modification	13
3.3 Residential HVAC.....	16
3.4 Residential Energy-Efficient Products.....	19
3.5 Residential Appliance Recycling	23
3.6 Residential Multifamily	26
3.7 Residential Home Energy Performance.....	29
3.8 Residential Moderate Income	33
3.9 Residential ENERGY STAR® New Construction	35
3.10 C&I Standard Program.....	38
3.11 C&I Custom Program	41
3.12 C&I Retro-Commissioning Program.....	43
A. PY4 PROGRAM EVALUATION REPORTS	46
B. COMMISSION GUIDANCE ON EVALUATION EFFORTS	47

TABLE OF TABLES

Table 1. Portfolio Ex Post Net Impacts Compared to Planned Impacts	3
Table 2. Portfolio Planned Savings by Program Year.....	6
Table 3. Portfolio Planned Costs by Program Year	7
Table 4. PY4 Evaluation Activities and Type of Assessment.....	8
Table 5. Bulb Sales by Type and Sales Channel	10
Table 6. PY4 Residential Lighting Program Net Impacts.....	10
Table 7. Planned Versus Actual Participation	13
Table 8. PY4 Behavioral Modification Program Net Impacts	14
Table 9. Summary of Program Verification Results	17
Table 10. PY4 HVAC Program Net Impacts	18
Table 11. Summary of Program Verification Results.....	20
Table 12. REEP Program Ex Ante and Ex Post Net Savings	21
Table 13. Summary of Participant Verification Results.....	24
Table 14. PY4 ARP Program Impacts.....	24
Table 15. Summary of PY4 Program Participation by Component	26
Table 16. PY4 Multifamily Program Net Impacts.....	27
Table 17. Summary of HEP Program Net Energy Impacts	31
Table 18. Summary of ESHP Program Net Energy Impacts	31
Table 19. Summary of WNCF Program Net Energy Impacts	33
Table 20. Summary of Program Verification Results.....	36
Table 21. PY4 ENERGY STAR New Homes Program Net Impacts	36
Table 22. C&I Standard Program Verification Results.....	39
Table 23. C&I Standard Program Net Impacts.....	39
Table 24. C&I Custom Program Net Energy Impacts.....	41
Table 25. Summary of Program Verification Results.....	44
Table 26. PY4 C&I Retro-Commissioning Net Impacts.....	44

1. EXECUTIVE SUMMARY

This document contains the PY4 evaluation results of the Ameren Illinois Company (AIC) portfolio of commercial and industrial (C&I) and residential energy efficiency resources. Opinion Dynamics Corporation, along with its subcontractors The Cadmus Group, Navigant Consulting, and Michael's Energy (the team), were contracted by AIC to provide an independent evaluation of the 2011-2014 electric and natural gas energy efficiency programs. In this document, we provide the integrated Program Year 4 (PY4) portfolio results as well as the detailed findings for each program as appendices.

Overall Results

At the portfolio level, the AIC programs exceeded their filed savings goals for PY4.¹ As Table 1 illustrates, the net realization rates for the entire portfolio are 130% for MWh and 142% for therms.

Table 1. Portfolio Ex Post Net Impacts Compared to Planned Impacts

Program	Planned Impacts ^a		Ex Post Net Impacts		Realization Rate ^b	
	MWh	Therms	MWh	Therms	MWh	Therms
<i>Residential Portfolio</i>						
Residential Lighting	82,485	-	145,737	-	1.77	-
Behavioral Modification	21,705	664,517	22,412	1,199,510	1.03	1.81
Appliance Recycling	19,889	-	11,673	-	0.59	-
HVAC	13,448	896,800	5,622	465,853	0.42	0.52
Efficient Products	11,079	324,590	1,275	104,440	0.12	0.32
Multifamily	4,874	247,116	7,385	293,274	1.52	1.19
Home Energy Performance & ESHP	2,593	100,890	1,975	597,308	0.76	5.92
Moderate Income	1,732	64,850	286	110,908	0.16	1.71
New Construction	273	12,831	189	12,800	0.69	1.00
Voltage Optimization	-	-	-	-	-	-
Residential Total	158,078	2,311,594	196,554	2,784,093	1.24	1.20
<i>C&I Portfolio</i>						
Custom	55,620	189,043	47,837	561,784	0.86	2.97
Standard	47,815	1,145,345	92,811	1,560,266	1.94	1.36
Retro-Commissioning	3,309	5,654	17,052	361,966	5.15	64.02
Nonresidential New Construction	8,194	51,483	-	-	-	-
Commercial Total	114,938	1,391,525	157,700	2,484,016	1.37	1.79
Portfolio Total	273,016	3,703,119	354,254	5,268,109	1.30	1.42

^a Source: AIC filing dated January 20, 2011.

^b The net realization rate is calculated by dividing the ex post net impact by the planned net impact.

Program performance as measured against the filed program goals was extremely strong in many cases across both the residential and commercial portfolios. On the electric side, both the residential and commercial sectors exceeded their goals. In particular, the performance of the Residential Lighting and C&I programs made the greatest contributions to achieving the portfolio goals. The Residential Lighting program achieved 11% more of the overall portfolio MWh than originally

¹ AIC's goals are at the portfolio level. The utility is not held to specific goals by program.

expected (from 30% of the portfolio planned impacts to 41% of the actual), while the Standard C&I program achieved 26% of the MWh (compared to 18% planned).

On the natural gas side, the commercial sector performed much better than planned, close to doubling the expected gas savings. Within the residential sector, the lower-than-expected performance of the Residential HVAC and Efficient Products programs was offset by the savings achieved by the Home Energy Performance and Moderate Income programs.

Key findings for specific programs are:

- The Residential Lighting program increased their goals by close to a million bulbs mid-year to help ensure that the overall PY4 portfolio energy goals were met. This large increase was possible due to a well-executed program with clear communication among the various program implementers.
- The Appliance Recycling program employed multiple strategies to increase participation. This included larger incentives and initiating a more aggressive marketing campaign. However, despite these actions, the program fell short of goals. This was partially due to somewhat lower-than-expected participation and to the retrospective application of a net-to-gross ratio (NTGR) that reduced the ex post net savings by close to 20%.
- The Home Energy Performance program helped the natural gas portfolio by bringing in substantially more therms than expected. In PY4, AIC increased staffing and improved conversion rates to help increase the total savings from retrofits.
- The Retro-Commissioning program has continued to expand over the last few program years and significantly exceeded both electric and gas savings goals. A key driver of this result is an updated program NTGR of 0.95.

2. INTRODUCTION

This report presents results from the evaluation of the forth program year of AIC's energy efficiency programs. For Program Year 4 (PY4), the portfolio of residential and commercial programs included the following:

- Residential Lighting
- Residential Behavioral Modification
- Residential HVAC
- Residential Energy-Efficient Products
- Residential Appliance Recycling
- Residential Multifamily
- Residential Home Energy Performance (including the Electric Space Heat Pilot (ESHP))
- Residential ENERGY STAR® New Homes
- Residential Moderate Income
- Commercial & Industrial (C&I) Standard
- Commercial & Industrial (C&I) Custom (including some New Construction projects)

The subsequent sections of this report present high-level findings from the evaluation of the PY4 programs. Within the Introduction, we also provide context around AIC's portfolio savings goals and resources, as well as an overview of the evaluation approach.

2.1 OVERVIEW OF THE AIC PORTFOLIO

The PY4 portfolio had energy goals of slightly over 270 GWh and 3.7 million therms. Goals are at the portfolio level, not at the program level. To increase the likelihood of achieving the portfolio goals, AIC has the ability to shift resources across all programs. AIC has energy goals (i.e., MWh and therms), but no statutory requirement for demand goals (MW). Table 2 presents the AIC energy goals by program in order of magnitude within the residential and commercial portfolios based on a fuel-neutral MMBTU energy savings.

Table 2. Portfolio Planned Savings, by Program Year

Program	TRC	Annual MWh Savings			Annual MW Savings			Annual Therm Savings		
		PY4	PY5	PY6	PY4	PY5	PY6	PY4	PY5	PY6
RES-Lighting	2.3	82,485	61,974	42,418	2.5	1.9	1.3	0	0	0
RES-Behavioral Modification	1.7	21,705	21,705	21,705	4.9	4.9	4.9	664,517	664,517	664,517
RES-HVAC	1.4	13,448	14,187	15,109	6.4	6.8	7.2	896,800	1,147,316	1,480,704
RES-Energy-Efficient Products	1.5	11,079	11,999	13,110	2.3	2.4	2.7	324,590	463,622	552,133
RES-Appliance Recycling	2	19,889	20,070	16,036	2.9	2.9	2.3	0	0	0
RES-Multifamily	1.9	4,874	5,217	5,285	0.9	1	1	247,116	290,831	313,078
RES-Home Energy Performance	1.4	2,593	2,665	2,728	0.7	0.7	0.7	100,890	103,916	107,034
RES-Moderate Income	1.4	1,732	1,774	1,800	0.5	0.5	0.5	64,850	66,795	68,799
RES-New Construction	1	273	304	329	0.1	0.1	0.1	12,831	14,268	15,449
RES-Voltage Optimization	1.1	0	0	0	4.5	4.5	4.5	0	0	0
RESIDENTIAL Portfolio Total	1.7	158,078	139,895	118,521	25.5	25.6	25.1	2,311,593	2,751,267	3,201,714
BUS-Standard	1.7	47,815	40,648	37,334	20.2	17.2	15.8	1,145,345	1,306,813	1,429,883
BUS-Custom	2	55,620	54,490	50,648	16.3	15.9	14.8	189,043	210,919	223,281
BUS-New Construction	1.3	8,194	7,123	6,454	2.9	2.5	2.2	51,483	50,035	47,131
BUS-RCx	3	3,309	3,196	3,019	0.8	0.8	0.7	5,654	5,002	4,651
BUSINESS Portfolio Total	1.8	114,938	105,458	97,456	40.1	36.3	33.5	1,391,525	1,572,768	1,704,945
AIC PORTFOLIO TOTAL	1.8	273,534	245,871	216,495	65.6	61.9	58.7	3,735,017	4,355,658	4,942,447

Source: AIC filing dated January 20, 2011.

In terms of portfolio costs, AIC's annual costs are close to \$60 million. Table 3 provides the costs by program.

Table 3. Portfolio Planned Costs, by Program Year

Program	Annual Program Costs (\$ millions)		
	PY4	PY5	PY6
RES-Lighting	\$ 7.00	\$ 5.21	\$ 3.74
RES-HVAC	\$ 6.84	\$ 8.07	\$ 9.69
RES-Energy-Efficient Products	\$ 3.31	\$ 3.59	\$ 3.99
RES-Appliance Recycling	\$ 2.66	\$ 2.77	\$ 2.28
RES-Multifamily	\$ 1.56	\$ 1.79	\$ 1.97
RES-Home Energy Performance	\$ 1.35	\$ 1.41	\$ 1.48
RES-Voltage Optimization	\$ 1.06	\$ 1.19	\$ 1.18
RES-Behavioral Modification	\$ 0.96	\$ 0.99	\$ 1.02
RES-Moderate Income	\$ 0.83	\$ 0.87	\$ 0.91
RES-New Construction	\$ 0.18	\$ 0.21	\$ 0.23
RESIDENTIAL Portfolio Total	\$ 25.76	\$ 26.10	\$ 26.50
BUS-Standard	\$ 12.06	\$ 12.50	\$ 13.15
BUS-Custom	\$ 11.17	\$ 11.40	\$ 10.91
BUS-New Construction	\$ 2.20	\$ 2.11	\$ 2.06
BUS-RCx	\$ 0.28	\$ 0.28	\$ 0.28
BUSINESS Portfolio Total	\$ 25.71	\$ 26.20	\$ 26.39
AIC Portfolio Admin Costs	\$ 2.57	\$ 2.60	\$ 2.64
AIC EM&V Costs	\$ 1.54	\$ 1.56	\$ 1.59
AIC Education Costs	\$ 1.29	\$ 1.30	\$ 1.32
AIC PORTFOLIO TOTAL	\$ 58.35	\$ 59.30	\$ 59.96

Source: AIC filing dated January 20, 2011.

2.2 PY4 EVALUATION APPROACH

The PY4 evaluation plan served as the foundation for the evaluation activities conducted. The evaluation approach included both program- and non-program-specific activities, including efforts to support the Statewide Technical Reference Manual (TRM) process. In general, the team implemented all aspects of the evaluation plan. However, two changes were made after the plan was finalized in June 2012:

- The team applied an in-service rate from the Statewide TRM for the Home Energy Performance (HEP), Moderate Income, and Multifamily programs.

- For lighting, the team also used the Statewide TRM for hours of use and the installation rate.²

Table 4 provides a summary of the evaluation activities performed by the team in PY4. Detailed information about the data collection activities and analyses performed for each program can be found in Appendix A.

Table 4. PY4 Evaluation Activities and Type of Assessment

Evaluation Activity	Residential										Commercial		
	Lighting	HVAC	Behavioral Modification	Home Energy Performance	Electric Space Heat Pilot	Appliance Recycling	Multifamily	Moderate Income	Efficient Products	ENERGY STAR New Homes	Standard	Custom	RCx
Program Material Review	● Every Program												
Program Manager and Implementer Interviews	● Every Program												
Energy Advisor or Key Account Executive Interviews											●	●	
Market Actor / Program Ally / Retailer Interviews				●	●	●		●			●	●	
Participant Survey		●		●	●	●		●	●		●		
Site Visits	●	●									●	●	
Ex Post Gross Assessment													
Applied deemed per-unit savings values to verified participation value	●	●		●	●		●	●	●	●	●		
Calculated savings using research			●			●					●	●	●
Ex Post Net Assessment													
Applied deemed NTGR	●	●		●	●	●	●	●		●	●	●	
Retrospective application of researched NTGR			●						●			●	●
Performed NTGR research for prospective use				●	●						●		

In addition to the activities outlined above, the evaluation team conducted a number of non-program-specific activities. We provide an overview of each activity below.

- **TRM Efforts:** Throughout PY4, the evaluation team reviewed documents and measure protocols submitted to the Stakeholder Advisory Group (SAG) by the Vermont Energy Investment Corporation (VEIC), and, as necessary, provided comments.

² The Statewide TRM was completed in time to use this piece of data. The TRM information was based on in-home surveys rather than telephone surveys and was considered by the evaluation team to be a reliable data point.

- **Evaluability Assessment:** The evaluation team conducted an evaluability assessment of the residential program-tracking database in PY4, and began an assessment of the C&I program-tracking database. In general, this effort consisted of three components: (1) a review of the Statewide TRM and identification of key tracking variables, (2) comparison of this list with the current database to identify any discrepancies, and (3) identification of approaches to the TRM for these measures that could potentially improve TRM accuracy, as well as describe additional data to collect that would enable the alternative calculation approach.
- **Coordination with Illinois Utilities:** As part of the evaluation planning process and as needed throughout the program year, the evaluation team consulted with their counterparts supporting evaluation efforts for other utilities in the state. These discussions helped to identify similarities and differences in approach, as well as to inform ongoing discussions of the NTGR framework and its application.
- **Program Design:** The team provided guidance on a number of program design questions throughout PY4. These included a review of savings assumptions for Light Emitting Diode (LED) lamps, as well as a planning net-to-gross ratio (NTGR) for a Program Year 6 (PY6) pilot called the Electric Homes program.
- **Cost-Effectiveness Analysis:** Upon completion of the program-specific final reports, the team prepared model inputs of evaluated program savings as determined through the evaluation effort for AIC. As needed, the team will also audit AIC's cost-effectiveness analysis based on this year's program results. This may include a review of AIC's assumptions for avoided costs, discount rates, measure cost information, administrative costs, and other relevant data.

3. PORTFOLIO RESULTS

The next set of sections provides the executive summary information from individual reports on each program. Appendix A presents the full reports of each program.

3.1 RESIDENTIAL LIGHTING

The Residential Lighting program was launched in August 2008 and is implemented by Conservation Services Group (CSG) with subcontractors Applied Proactive Technologies (APT) and Energy Federation, Incorporated (EFI). In PY4, sales goals for the program were originally set at 3.2 million units, and were increased to 4.3 million during the year. This evaluation reviews the program's performance in PY4, which began in June 2011 and ended in May 2012.

Impact Results

AIC's Residential Lighting program sold a total of 4,370,576 bulbs in PY4, exceeding both its original and revised bulb sales goals. The original sales goal of 3.2 million bulbs was increased to 4.3 million to ensure that overall PY4 portfolio goals were met. As shown in Table 5, the vast majority of bulbs sold (94%) were standard CFLs sold through the markdown program. The web store sold a very small number of bulbs, though it did sell the first LEDs discounted through the program.

Table 5. Bulb Sales by Type and Sales Channel

Bulb Type	Markdown	Web store	Total
Standard CFL	4,097,905	1,047	4,098,952
Specialty CFL	270,933	673	271,606
LEDs	0	18	18
Total	4,368,838	1,738	4,370,576

AIC chose to begin applying the 2012 Statewide TRM installation rate method in PY3, which spreads program savings out over the three years it takes for customers to install all of the program bulbs they purchased. As a result, PY4 savings are comprised of bulbs sold in PY3 and installed in PY4, in addition to bulbs sold in PY4 and installed in PY4. A portion of PY4 savings will be applied in future years to PY5 and PY6.

As shown in Table 6, the program achieved 15.4 MW in net demand savings and 145.7 MWh in net electric savings.

Table 6. PY4 Residential Lighting Program Net Impacts

Program	Ex Ante Net Impacts		Ex Post Net Impacts	
	MW ^a	MWh	MW	MWh
Residential Lighting Program	--	141,892	15.36	145,737
Net Realization Rate				1.03

^a Conservation Services Group (CSG), the implementer, is not required to track demand savings.

Note: Realization Rate = Ex Post Value / Ex Ante Value.

The Residential Lighting program's realization rate for PY4 net energy savings is 1.03. Ex post savings are different from ex ante savings for several methodological reasons:

- The program savings method assumes that 100% of program sales are installed in residential spaces. Our evaluation assumes that 3% of bulbs are installed in commercial spaces that have greater hours of use.
- The program savings method assumes residential bulbs are used for 854 hours a year. The evaluation applied the 2012 Statewide TRM hours of use assumptions, which specify 938 hours for residential spaces and 3,198 for miscellaneous commercial spaces.
- The evaluation applied the 2012 Statewide TRM banked savings method whereas the program tracking used a single installation rate of 93%.

Process Results

The Residential Lighting program ran smoothly in PY4 according to program staff and participating retailers. Implementation staff credited excellent performance of and communication between the various implementers involved in the program as crucial to its success. Additionally, participating retailers are satisfied with the program and its processes. Retailers expressed a clear understanding of the program and excellent lines of communication with their field representatives.

AIC relied primarily on in-store marketing to promote the program. The program supplied participating retailers with a number of different types of point-of-purchase (POP) materials. Field representatives for the program conducted a number of in-store product demonstrations with customers and trainings with retailers. All retailers reported receiving and using POP sales materials from their field representatives. All of the retailers found the signage and materials useful—one retailer suggested that in the future, the program could provide large signage for placement outside the store.

CFL penetration and saturation are significantly higher in 2012 compared to 2010. Our in-home lighting study found that 93% of AIC homes have at least one CFL installed, compared to 87% of homes in 2010. CFLs are installed in 33% of light sockets in the average home in 2012, compared to 25% in 2010.

Given current levels of CFL socket saturation, opportunity remains for additional savings from a Residential Lighting program that targets both standard and specialty bulbs. CFLs are installed in 41% of standard sockets compared to 18% of specialty sockets. Though CFL saturation is higher in standard than specialty sockets, the average home has nearly 2.5 times as many standard sockets as specialty sockets. We estimate that there are an additional 15.6 million standard sockets and 9.8 million specialty sockets that could be filled with CFLs or LEDs.

Despite the potential for additional savings from energy-efficient lighting, it will be important to monitor purchase behavior in light of the Energy Independence and Security Act (EISA) regulations going into effect in the coming years. Awareness of EISA is currently relatively low, with slightly over half of customers aware of the regulations. When EISA is explained, a majority of customers say they will purchase CFLs to fill sockets now filled with EISA-impacted bulbs. Few report that they will purchase lower- or higher-wattage incandescents or the new EISA-compliant halogens. Likewise, few report that they will stockpile 75-watt bulbs in anticipation of their phase-out in 2013. Our in-home lighting study also found little evidence of actual stockpiling of 100-watt and 75-watt incandescents, the first two wattages impacted by EISA. Program savings could be adversely impacted in the next few years if EISA is the main driver of increased CFL usage.

Recommendations

Within this context, we offer the following recommendations for program improvement.

- **Track all the data necessary to calculate program savings in one location.** The official program-tracking database does not contain all of the information necessary to calculate program savings. Base wattage and lumens are not tracked. The 2012 Statewide TRM also requires type of bulb (e.g., specialty, standard) and type of specialty (e.g., globe, reflector). The savings calculations in the new TRM are much more complex. Including all necessary data in the tracking database would aid in program tracking and evaluation.
- **Attempt to increase sales of specialty CFLs to increase CFL socket saturation.** Although the program discounts a large number of specialty CFL products, only 6% of bulbs sold through the program are specialty CFLs. Specialty CFL saturation lags behind standard CFLs. Price is still a barrier to purchase for discounted specialty CFLs given the bulbs' higher regular retail price. AIC may want to consider increasing incentives on specialty CFLs to attract customers who will not purchase such an expensive bulb.
- **Closely monitor the impact of program incentives versus EISA on CFL purchases.** EISA has changed the products available to customers. After receiving information about the different bulbs they could purchase to replace 100-watt incandescents, most customers said they would purchase CFLs and not switch to a different wattage of incandescents or EISA-compliant halogens. The information we provided to customers included purchase price and operating cost. If EISA ends up being the main driver of CFL sales, program net savings will be adversely impacted. If customers are accurately self-reporting their purchase intentions, the program may need to reconsider incenting EISA-regulated bulbs. The majority of program sales are 60-watt-equivalent CFLs, so the impact on program savings will not be until PY7.
- **Explore the market for LED incentives.** At the same time, provide customers with guidance about what to look for when purchasing LEDs. Interest in LEDs is currently low due to the high costs of the bulbs, but as costs come down the bulbs would be a viable alternative to CFLs in some applications. It is important for early adopters of LEDs to be happy with their purchase. Early adopters of CFLs were disappointed in the product, in part because the early products had problems. A large number of LEDs are entering the market and not all of them have the same capabilities. In addition, dimmable LEDs are not compatible with all dimmers, which is also true of dimmable CFLs. Customers may be disappointed with the performance of these products given their higher cost. AIC should consider providing customers with information about LEDs and their different applications.

3.2 RESIDENTIAL BEHAVIORAL MODIFICATION

As a part of its residential portfolio, AIC offers the Behavioral Modification program. This program began as a pilot in August 2010, and has since expanded to a full program, treating over 260,000 customers in PY4. The specific goals of the program are to achieve the following:

- Reduce energy consumption by driving energy-efficient behaviors
- Boost customer engagement and education by helping customers understand and save energy
- Educate customers about no-cost and low-cost energy savings measures and behaviors

Three different treatment types are offered, including a paper report that is mailed to the customer's billing address, an electronic copy if Opower, the program implementer, has an email address on file, and the online portal, which customers can log onto to view their report and additional information. Customers may decide that they no longer want to receive paper reports mailed to them if they receive an email report, but Opower indicates that only a few customers have decided to not receive paper reports. Reports are sent to treated customers on a monthly basis for the first three months of program treatment. After the first three months, reports are sent on a bimonthly basis. The frequency of reports may increase to a monthly basis to encourage energy savings during times of peak energy usage.

A Home Energy Report (HER) includes three key features, including a comparison of the customer's current energy usage to past usage, a comparison of the customer's energy usage to similar households in the area, and tips for decreasing energy consumption. Energy-saving tips may include setting back thermostats, lowering the temperature of the water heater, replacing old appliances, and more.

Impact Results

- **The Behavioral Modification program successfully reached its targeted number of participants for each of the program groups.** In total, the program treated 267,462 customers in PY4. Table 7 below compares the number of customers to whom the program planned to send HERs and the number of actual customers receiving the reports. Planned numbers differ from actual numbers for a variety of reasons. Opower always over-selects the number of households in a program, with the expectation that some customers may need to be removed from treatment.

Table 7. Planned Versus Actual Participation

Group Name	Fuel Type	Planned Number of Treated Participants	Actual Treated Participants
Original Group	Electric	50,000	50,001
	Gas	50,000	50,001
Expansion Group 1	Electric	75,000	76,355
	Gas	75,000	76,355
Expansion Group 2	Electric	100,000	119,917
	Gas	100,000	119,917
Expansion Group 3	Gas	20,000	21,189

Group Name	Fuel Type	Planned Number of Treated Participants	Actual Treated Participants
Total Participants	Electric	225,000	246,273
Total Participants	Gas	245,000	267,462

- **The Behavioral Modification program exceeded its gas savings goal by 31% and achieved 84% of its electric savings goal.** In total, the program saved 22,412 MWh and 1.2 million therms in PY4. Table 8 details these findings.

Table 8. PY4 Behavioral Modification Program Net Impacts

Group Name	Fuel Type	Net Savings per H.H.% ^a	Adjusted Net Savings per H.H.% ^a	Total Evaluated Participants ^b	Total Program Savings: Evaluated Period ^c	Total Adjusted Program Savings: Evaluated Period ^c
Original Group	Electric	1.46%	1.46%	48,694	5,230	5,230
	Gas	1.14%	1.03%	48,695	351,820	319,370
Expansion Group 1	Electric	1.32%	1.29%	72,913	13,317	13,039
	Gas	0.85%	0.79%	72,893	665,710	620,980
Expansion Group 2	Electric	0.88%	0.87%	108,654	4,200	4,142
	Gas	0.35%	0.35%	108,171	173,940	173,940
Expansion Group 3	Gas	0.96%	0.96%	16,616	85,220	85,220
Overall	Electric	1.14%	1.13%	230,261	22,747	22,412
	Gas	0.70%	0.66%	246,375	1,276,690	1,199,510

^a Total program savings are shown in MWh and therms. Adjusted net savings take into account or remove energy savings that resulted from customer participation in other AIC programs in PY4.

^b The number of evaluated participants is less than the number of treated participants, as some customers were eliminated from the analysis.

^c Total savings for Expansion Groups 2 and 3 were calculated using a full model rather than summing across seasonal model results, as post-treatment data was only available for a portion of the year. For the remaining groups, total savings were determined by summing modeled seasonal savings per household by cohort.

- **The Original Group per-household savings in PY4 exceeded savings in PY3 for both electric and gas.** Electric savings in PY3 were 1.2% per household, compared with 1.46% in PY4, while gas savings were 0.7% per household in PY3 and 1.03% in PY4. This is consistent with prior evaluations of this program where the second program year sees savings higher than the first year.
- **The largest gas savings were found in the spring season for three of the groups.** The evaluation team compared customers by season. In the analysis for gas savings, all groups but one showed significant savings in the winter, but the largest gas savings were in the spring season. The analysis by season for electric savings showed that in two of the groups, the highest electric savings were in the winter season. However, summer months were not available in the evaluated post period for two of these groups.

- **As expected, the rate of electricity savings tends to increase with the level of baseline consumption, but this is not always true for gas savings.** The evaluation team compared customer response to the Home Energy Reports by baseline usage, and found that as baseline consumption increases, the rate of electric savings also tends to increase. However, on the gas side this is not always the case. Medium-usage households saved slightly less (as a percentage of baseline) than lower-usage households in one group, while high-usage households saved less than medium-usage households in another group.

Process Results

- **Overall, AIC, CSG, and Opower have found the Behavioral Modification program to be straightforward to administer, and have faced only a limited number of challenges.** Through in-depth interviews with AIC, CSG, and Opower, the evaluation team found that the program is fairly turn-key. According to AIC, customers are satisfied overall with the program, and AIC has been able to work with CSG and Opower to address any issues identified.
- **Behavioral Modification program participants are more likely to participate in other AIC residential programs; however, the number of participants varies by program group and the types of other programs that customers participate in.** Our research indicates that the Behavioral Modification program led to an increase in overall participation in other programs. However, participation rates vary and are not always consistent. Within the gas Expansion Group 2, the control group customers had a higher rate of participation.

Recommendations

- **AIC and CSG might consider the Behavioral Modification program as an avenue to boost savings in other programs through targeted marketing.** Overall, treated customers participate in more AIC programs than non-treated customers. If other AIC programs are behind on goal achievement, direct marketing could be targeted to these customers to increase program participation. However, it should be noted that energy savings achieved as a result of participation in other AIC programs would reduce total Behavioral Modification program savings, as the savings can only be claimed once.
- **AIC, CSG, and Opower should continue to monitor the energy use of customers dropped from the program, specifically those in Expansion Groups 2 and 3.** This may give an indication of the persistence of the treatment after the treatment is terminated.

3.3 RESIDENTIAL HVAC

Ameren Illinois Company's (AIC's) Residential Heating and Air Conditioning program (HVAC program) offers customer incentives for the purchase of high-efficiency furnaces, boilers, air source heat pumps (ASHPs), ground source heat pumps (GSHPs), or central air conditioners (CACs), all of which must be installed by an HVAC Registered Program Ally. Applicable federal equipment standards serve as baseline efficiency conditions for new heating and cooling systems.

Incentive levels vary according to equipment types and efficiency levels of existing equipment, and AIC customers receive an incentive for the installation of new equipment. The incentive is intended to persuade customers to purchase more-efficient equipment than they might otherwise install.

The program also includes an early replacement incentive aimed at customers with operating but inefficient equipment. Through this offering, the program encourages customers to retire equipment for newer, more-efficient units. Incentives pass from HVAC contractors to consumers, and the incentives show up as line-item deductions on contractors' installation invoices.

Impact Results

Our assessment of the HVAC program indicates that program tracking is accurately capturing the number of program participants and program savings. Table 9 shows the number of program participants by measure type and the number of verified measures listed for site visits, phone surveys, and document reviews. Only the document reviews affected the overall verification rate. Our review found that one ASHP measure should have claimed higher savings. Due to limited sample size, we applied verification results to all electric measures combined (CACs, ASHPs, and GSHPs).

Table 9. Summary of Program Verification Results

Measure	Program Participation (n)	Verified Participants: Site Visits and Phone Survey	Verified Measures – Document Review ^a	Ex Ante per-Unit Savings Value	Verified Energy Savings/Ex Ante Sample Savings – Document Review	Verification Rate
Gas Furnace installations (92/95 AFUE)	5,526	50/50	43/43	146 therms (92 AFUE) 171 therms (95 AFUE)	$\frac{7,228 \text{ therms}}{7,228 \text{ therms}} = 1.0$	1.00
Gas Boilers ^d	75	N/A	N/A	230 therms	N/A	N/A
ASHPs	419	59/59	1/2 ^e	373 to 6,071 kWh ^b	$\frac{46 \text{ MWh}}{44 \text{ MWh}} = 1.05$	1.05 ^c
CACs	4,083	59/59	24/24	373 to 1,928 kWh ^b		
Ground Source Heat Pumps	153	N/A	1/1	3,151 kWh		

^a Verification rate for electric measures is based on verified kWh savings for ASHPs, CACs, and GSHPs combined, not the ratio of documents reviewed.

^b Range of savings shown. Savings vary by equipment efficiency and baseline efficiency.

^c Demand verification rate was calculated in the same way and is 1.03. Energy verification rate is different than demand verification rate because demand savings are only counted for summer, while energy savings are year-round.

^d The team assumed a verification rate of 1.0 for this measure.

^e 1 of 2 projects had verified savings equal to the tracking database; the other project had higher savings than posted in the tracking database.

Table 10 shows total program net impacts. The 1.05 verification rate for electric measures increases the reported savings. As specified by the NTG framework, which is provided in the Illinois Commerce Commission (ICC) Order for Docket 10-0568, the evaluation team estimated net savings using PY2 net-to-gross ratios (NTGRs) of 0.63 for electric measures (ASHPs, CACs, and GSHPs) and 0.49 for gas furnaces and boilers.

Table 10. PY4 HVAC Program Net Impacts

Measure	NTGR	Ex Ante Net Savings			Ex Post ^a Net Savings		
		MW	MWh	Therms	MW	MWh	Therms
ASHP	0.63	0.17	235	0	0.18	246	0
ASHP Early Replacement	0.63	0.73	1,002	0	0.75	1,051	0
CAC	0.63	0.20	278	0	0.21	292	0
CAC Early Replacement	0.63	2.60	3,539	0	2.66	3,714	0
Ground Source Heat Pump	0.63	0.04	304	0	0.04	319	0
Gas Furnace	0.49	0	0	457,401	0	0	457,401
Gas Boiler	0.49	0	0	8,453	0	0	8,453
Total		3.75	5,357	465,853	3.84	5,622	465,853
<i>Verification Rate</i>					<i>103%</i>	<i>105%</i>	<i>100%</i>

^a Ex post results are based on a review of the program-tracking database and participant invoices.

Process Results

The process evaluation included two research tasks: staff interviews, which helped the evaluation team to better understand the residential HVAC program and its operations; and a customer satisfaction survey. Based on these data collection efforts, we determined that the program, as designed, operates effectively and customers are satisfied with the incentives. While PY4 participation dropped from PY3 levels, the drop may be the result of the phase-out of federal tax incentives.

The evaluation team has two recommendations for AIC to consider that may improve HVAC program success:

- **Emphasize On-Bill Financing (OBF).** OBF is a new residential energy efficiency loan program starting in PY5 that AIC should emphasize in marketing materials that customers see when deciding on equipment replacement. AIC's OBF offering is a way for customers to overcome the high upfront cost barrier. AIC staff report that many HVAC program participants are taking advantage of the OBF offering in PY5, which allows them to repay the loan they take out for the HVAC equipment on their utility bill. Further, a recent California evaluation of OBF indicated that the majority of loan program participants would not have participated without the program. When combined with the HVAC program's early replacement incentive, OBF offers homeowners an opportunity to affordably replace their inefficient HVAC systems with high-efficiency systems and with no upfront cost barrier.
- **Consider Quality Installation (QI).** Promote quality installation practices to maximize energy savings. Most other utilities with HVAC programs require or incentivize QI practices; however, actual savings are difficult to quantify. The evaluation team will use PY5 site visit and metering data to assess the opportunity to increase savings through QI.

3.4 RESIDENTIAL ENERGY-EFFICIENT PRODUCTS

AIC's Residential Energy-Efficient Products (REEP) program, which has historically offered energy-efficient product rebates through the Upstream Lighting program, became its own program in Program Year 4 (PY4), which covered the period of June 1, 2011, to May 31, 2012. Through retailers in AIC's service territory, the program offers customers the following types of efficient products:

- Programmable thermostats
- Heat pump or efficient gas water heaters
- Air purifiers
- Dehumidifiers
- Room air conditioners
- Smart power strips

Customers apply for rebates at the time of purchase, with the rebate application attached to the product, making the process easier for customers to submit paperwork.

To qualify for rebates, customers must also submit their AIC utility bills.

The program primarily seeks to create a stronger market for efficient products by exposing them to a wide variety of customers. The current suite of measures ranges from simple and easy-to-install items to more-complex products requiring professional installation. Products address electric or gas customers,³ with a wide range of rebate amounts offered; both gas and electric customers qualify for programmable thermostats.

Impact Results

Table 11 outlines PY4 program participation levels. Verification rates were high for most measures in this program. Survey results indicate that only a small percentage of programmable thermostats and dehumidifiers were not installed. The survey also indicated that a significant percentage of both programmable thermostats and smart power strips are not being used to save energy. Ex post realized savings only count the proportion of thermostats and smart power strips estimated to be used in an energy-efficient manner.

³ Customers purchasing gas products must be AIC gas customers; customers purchasing electric products must be AIC electric customers.

Table 11. Summary of Program Verification Results

Measure	Unit	Program Participation* (N)	Installed Products	Products in Use for Energy Savings	Verification Rate
Programmable Thermostat	Each	3,730	3,655	1,977	53%
Heat Pump Water Heater	Each	73	73	73	100%
0.67 Water Heater	Each	243	243	243	100%
0.70 Water Heater	Each	27	27	27	100%
Air Purifier	Each	907	907	907	100%
Dehumidifier	Each	120	112	112	93%
Room Air Conditioner	Each	5,554	5,554	5,554	100%
Smart Power Strip	Each	1,482	1,482	682	46%

*Number of rebates.

Table 12 shows the PY4 program ex ante and ex post net impacts. We calculated ex ante impacts for all products using the fixed unit savings values and NTGRs from Commission Order for Docket 10-0568. These ex ante savings all assumed a 100% verification rate, except for programmable thermostats, which assumed an 86% verification rate to account for those not programming the thermostats. For ex post results, we applied verification rates outlined in Table 11 and NTGRs outlined in Table 12, determined through our estimates of free ridership and spillover from the participant surveys.

Table 12. REEP Program Ex Ante and Ex Post Net Savings

Measure	Savings Type	Ex Ante Gross Savings	Ex Ante NTGR	Ex Ante Net Savings	Verification Rate	Verified Gross Savings	NTGR	Ex Post Net Savings	Net Realization Rate
Programmable Thermostat AC and Gas Heat	Therms	205,958	0.87	179,183	53%	109,158	0.90	98,634	55%
	MWh	361	0.87	314	53%	192	0.86	165	52%
	kW	184	0.87	160	53%	98	0.86	84	52%
Programmable Thermostat Electric Heat	MWh	509	0.87	443	53%	270	0.86	232	52%
	kW	0	0.87	0	53%	-	0.86	-	N/A
Heat Pump Water Heater	MWh	132	0.76	100	100%	132	0.86	113	113%
	kW	6	0.76	5	100%	6	0.86	5	113%
0.67 Water Heater	Therms	5,589	0.58	3,242	100%	5,589	0.90	5,050	156%
0.70 Water Heater	Therms	837	0.58	485	100%	837	0.90	756	156%
Air Purifier	MWh	519	0.76	394	100%	243	0.78	190	103%
	kW	326	0.76	247	100%	28	0.78	22	103%
Dehumidifier	MWh	28	0.76	21	93%	26	0.78	20	96%
	kW	6	0.76	5	93%	6	0.78	5	96%
Room Air Conditioner	MWh	578	0.76	439	100%	578	0.78	451	103%
	kW	183	0.76	139	100%	183	0.78	143	103%
Smart Power Strip	MWh	262	0.76	199	46%	121	0.86	104	52%
	kW	29	0.76	22	46%	14	0.86	12	52%
Total Program ^a	Therms	212,384	0.86	182,911		115,584	0.90	104,440	57%
	MWh	2,113	0.81	1,701		1,560	0.82	1,275	75%
	kW	437	0.81	352		334	0.80	270	77%

Note: Ex ante results are calculated using the same fixed unit values as the ex post results, without adjustment for verified purchase or installation rates. Ex post results are calculated using verified purchase, installation, and usage rates and new NTGR estimates.

^a Total program results may not exactly match the sum of the program results due to rounding.

Process Results

Overall, the Residential Energy-Efficient Products program has worked as intended. Retailers play an important role in the program, as the majority of customers learned of the program through visits to retail establishments. Customers are overwhelmingly satisfied with the available products, rebate process, and the overall program. The primary improvement area customers identified was increased program advertising. Customer surveys revealed that many products served as replacements for products still in good condition. The program's NTGR is relatively high compared to other utility programs, though this may be due in part to the product mix, which includes smart power strips, programmable thermostats, heat pumps, and water heaters, which have a low free ridership rate (and are not included in many appliance rebate programs). Another factor affecting free ridership is that these measures also have higher incentives relative to purchase costs. Surveyed participants also reported significant spillover (21% on the gas measures and 8% on the electric measures).

3.5 RESIDENTIAL APPLIANCE RECYCLING

AIC's Residential Appliance Recycling program (ARP) offers free recycling of refrigerators and freezers to residential and small commercial customers. Participants receive a \$50 incentive payment, and the program implementer picks up and hauls appliances to its recycling facility in Springfield, Illinois. The program not only removes older, inefficient appliances from use in AIC's service territory, but also disposes of them in an environmentally responsible manner.⁴

AIC electric customers qualify for the program if they are served under Residential Delivery Service (Rate DS-1) or Small General Delivery Service (Rate DS-2). Equipment must meet the following requirements to qualify for the program:

- Appliances are located on account premises and are operational at the time of pickup
- Full-sized units, between 10 and 27 cubic feet
- Household-type models (commercial refrigerators and freezers do not qualify)

As an additional service, the program picks up and recycles working room air conditioners when picking up refrigerators or freezers, although air conditioners do not qualify for incentives.

Impact Results

Gross Impacts

- All participants listed in the program-tracking database were verified for PY4.
- PY4 participation increased by 52% from PY3, increasing from 9,333 appliances (excluding air conditioners) to 14,232.
- Part-use (percentage of time the product is plugged in) for PY4 increased for refrigerators, from 0.88 to 0.91, but decreased for freezers, from 0.93 to 0.85, over PY3. The change in part-use for refrigerators was not statistically significant, but the change for freezers was significant at 90% confidence.

Net Impacts

- In PY4, the net-to-gross ratio (NTGR) substantially declined, from 0.79 to 0.64 for refrigerators and from 0.82 to 0.65 for freezers. The decline is consistent with prior analysis that predicted a decline in NTGR but an increase in program savings associated with opening the program to primary units.
- The NTGR change also reflects the participant survey response data. In PY4, a higher proportion of survey respondents indicated they would have disposed of their units by taking them to the scrap yard, dumping them on their own, or having a family member do so for them (32% in PY4 and 24% in PY2). In addition, there were respondents who indicated they would have sold their units or had them picked up by a used appliance dealer, but their units were deemed unviable on the secondary market due to age or condition. These responses

⁴ This includes disposal of oils, PCBs, mercury, and CFC-11 foam, and recycling of CFC-12, HFC-134a, plastic, glass, steel, and aluminum.

indicate free ridership, since the unit would have been removed from the grid in the program's absence.

Table 13. Summary of Participant Verification Results

Measure	Units	Participants	Verified Participants	Verification Rate
Refrigerator Recycling	Number of Refrigerators	10,696	10,696	100%
Freezer Recycling	Number of Freezers	3,536	3,536	100%
Air Conditioner Recycling	Number of Air Conditioners	10	10	100%

Table 14. PY4 ARP Program Impacts

Measure	PY4 Ex Ante ^a Net Impacts		PY4 Ex Post ^b Net Impacts		Net Realization Rate
	MW	MWh	MW	MWh	
Refrigerator Recycling	1.47	12,397	1.07	9,077	73%
Freezer Recycling	0.46	3,858	0.31	2,586	67%
Air Conditioner Recycling	0.00	9.68	0.00	9.70	100%
Total	1.93	16,264	1.38	11,673	72%

^a Ex ante determined by multiplying deemed estimates by participation and PY2 NTGR values.

^b Ex post determined by adjusting part use factors, NTGR, and verified participation.

Process Results

- For PY4, the incentive increased from \$35 to \$50, which helped drive increased participation.
- Participation in PY4 was also increased by a more aggressive marketing strategy, including the following:
 - The Energy Hog mascot, which included live appearances at community events such as the Illinois State Fair
 - Initiating a retailer partnership with Sears
 - Doubling the nonprofit referral bonus (whereby a nonprofit that the participant names as a referral entity is provided cash) from \$10 to \$20 during the winter holiday season. Contrary to expectations, the increase in nonprofit referral bonus did not bring about an increase in participation during slow winter months.
 - Widely distributing printed materials, including advertisements on gas station pumps, coloring pages, and flyers at grocery stores. Additionally, this program collaborated with AIC's Lighting program implementer, Applied Proactive Technologies, Inc. (APT), and APT field representatives left brochures at small appliance retailers they would visit as part of the Lighting program.

Recommendations

- Marketing efforts appear to be very successful in bringing new participants to the program. We recommend AIC continue to deploy current marketing strategies with the exception of the retail partnership.
- While the nonprofit referral portion of the marketing program may be successfully reaching customers, the doubling of the bonus during the winter holidays did not appear to increase participation relative to the same months in PY3. Including an indicator of a nonprofit referral in the tracking database would allow more accurate assessment of the impact.
- The retail partnership did not appear to significantly contribute to program participation in PY4 (less than 0.5% of participants were marked as having come through the retail channel). In addition, units that are replaced also decrease savings by impacting the part-use factor due to units that had been primary units changing to secondary units after the primary unit is replaced. AIC should carefully consider the relative benefits of continuing the retail partnership.

3.6 RESIDENTIAL MULTIFAMILY

AIC offers the Residential Multifamily program to owners and managers of residential properties with three or more units in its service territory. The program comprises three different components:

- The In-Unit Energy Efficiency Component, which offers free compact fluorescent light bulbs (CFLs), faucet aerators, and low-flow showerheads for in-unit installation, along with an informational brochure for residents.
- The Common Area Lighting Component, which provides rebates for lighting fixture upgrades, CFLs to replace incandescent bulbs, occupancy sensors, and exit sign replacements.
- The Major Measures Component, which offers incentives for air sealing, attic and wall insulation, HVAC measures, and programmable thermostats.

The Multifamily program launched in November 2008, and is implemented by Conservation Services Group (CSG).

Impact Results

We verified Multifamily program participation in PY4 by reviewing the implementer's tracking database. Table 15 provides participation by program component using both the number of projects completed and multifamily customers. As shown in Table 15, there were 601 projects serving 184 customers in PY4.

Table 15. Summary of PY4 Program Participation by Component

Program Component	Number of Projects	Number of Customers
In-Unit Component	178	100
Common Area Lighting Component	12	11
Major Measures Component	411	73
Total	601	184

The evaluation team also verified program participation at the measure level. Realization rates of 100% were found for the In-Unit and Common Area Lighting Components, while the Major Measures Component had a realization rate of 103%.

As shown in Table 16, in total the program saved 7,385 MWh and 293,274 therms. The program exceeded goals (5,675 MWh and 74,457 therms) by 30% and 294%, respectively. This accomplishment is primarily due to higher-than-expected participation in the Major Measures Component in PY4. Ex ante savings are those that were ultimately claimed by the program at the end of PY4. Finally, ex post are those savings estimated by the evaluation team through a review of the program-tracking database and application of fixed deemed savings values.

Table 16. PY4 Multifamily Program Net Impacts

Program Component	Ex Ante Net Impacts			Ex Post Net Impacts		
	MW	MWh	Therms	MW	MWh	Therms
In-Unit Component	0.2	3,436	40,658	0.4	3,608	44,164
Common Area Lighting Component	0.0	264	--	0.0	269	--
Major Measures Component	0.1	2,848	230,834	1.2	3,508	249,110
Total	0.3	6,548	271,492	1.5	7,385	293,274
Net Realization Rate				5.00	1.13	1.08

Aside from the higher-than-anticipated results of the Major Measures Component, other differences in planned, ex ante and ex post savings values include the following:

- The implementer used lower per-unit savings values than what was deemed for faucet aerators (both electrically heated and gas heated domestic water). This is because these values were revised after the start of PY4, and CSG's contract did not allow for the updated values to be applied retroactively in tracking its goals.
- Participation was lower than planned for the In-Unit and Common Area Lighting Components. CSG hypothesizes that the economy may have still had an effect on some property managers, hindering them from making additional building investments through the Common Area Lighting Component. Staff resources were stretched due to the unexpectedly high volume of Major Measures projects, which may have resulted in lower participation for the In-Unit Component.
- A lower NTGR was used for some Common Area Lighting projects than the deemed NTGR value of 0.80.
- The implementer applied NTGRs for the Major Measures Component from the AIC PY2 Home Energy Performance Report instead of updated NTGRs from the PY3 Home Energy Performance Report. The NTGR for air sealing increased from 0.63 to 0.93, resulting in higher ex post net savings totals.
- The implementer claimed 675.2 kWh for programmable thermostats in electrically heated buildings, while the deemed savings values for PY4 are 2,720 kWh for buildings with electric resistance heat and 67 therms and 680 kWh for buildings with gas heat and central air conditioners. If programmable thermostats become a larger part of program savings, this may be an area of future research for the evaluation team.

Process Results

The evaluation team reviewed program materials and conducted in-depth interviews with the AIC Multifamily Program Manager and the CSG Multifamily Program Manager in June and July of 2012 (n=2). The in-depth interviews explored several areas, including the following: program goals and objectives, program design and implementation, marketing and outreach, program tracking, involvement of trade allies, changes in PY4, and expected changes in PY5.

One key change from PY3 was the addition of the Major Measures Component, which includes incentives for air sealing, attic and wall insulation, HVAC measures, and programmable thermostats.

This component experienced high participation rates, and drove much of the program savings for PY4.

Key Recommendations

Key recommendations for the program include the following:

- While there are eight participating trade allies, the program is primarily dependent on one trade ally for the Major Measures Component. This creates a certain amount of risk if this trade ally were no longer able to work with the program. AIC and CSG may want to develop a strategy to engage and enlist new trade allies to participate in the program, or alternatively, reach out to other currently participating trade allies to determine how the program could assist them in bringing in more projects. Training may be necessary so that potential trade allies have the necessary skills to install insulation and air sealing in multifamily buildings.
- Total project costs for Major Measures projects should be collected, tracked, and monitored. This information would allow the evaluation team to pursue future research questions such as: How much of the project cost does the incentive amount cover? Would property owners be willing to initiate a project with a lower incentive?
- Participation across program components was low, with only seven unique customers participating in multiple program components in PY4. While cross participation may be higher across program years (perhaps an area of future research), CSG could consider strategies to market across the program components, such as returning to past customers and making them aware of other program offerings.
- If programmable thermostats are offered at no cost through the program, AIC and CSG should ensure that adequate tenant education is offered, as this is an area where other utility programs have struggled. Tenant dissatisfaction could result if they do not know how to set the thermostat and change settings if necessary, resulting in unrealized energy savings. Several options may be considered to educate tenants, including:
 - Providing each tenant unit with a one-page handout that gives the customer basic instructions for the most common settings and preferred temperature settings for optimal energy efficiency
 - Using the customer call center to answer tenant questions on how to set their thermostat or make changes. As an added step, a sticker with the customer call center phone number could be affixed to the thermostat itself.
 - Training property managers and owners on thermostat settings so they can answer tenants' questions
 - Setting up temporary displays in common areas with educational and instructional materials
 - Depending on the area being served, information may need to be provided in multiple languages

3.7 RESIDENTIAL HOME ENERGY PERFORMANCE

The Residential Home Energy Performance (HEP) program is now in its fourth year of implementation (PY4). The HEP program is a home diagnostic and improvement program offered to AIC's residential customers. The program has two parts: 1) audits for direct install measures, and 2) incentives for additional energy efficiency opportunities. A customer can participate in the program either by receiving an audit from an HEP Energy Advisor, or through contacting a program ally to install shell measure improvements.

The HEP program also focuses on developing a local home performance industry and is in the process of transforming into a more comprehensive Home Performance with ENERGY STAR® (HPwES) program. The HEP program is working toward developing the local contractor network in Illinois through facilitating BPI certification and other whole-building science training.

The Electric Space Heat Pilot (ESHP) is a new program. ESHP is a home diagnostic program offered to existing homes. The program focuses on serving AIC customers living in older homes with electric space heat. CSG implements the program, which provides a comprehensive energy audit (including blower door testing and combustion safety testing) at no cost to targeted customers. CSG staff install several low-cost measures at the time of the audit. These measures include CFLs and/or water conservation measures, depending on homeowner eligibility and permission, in addition to blower door-assisted air sealing of the home by a specially trained air sealing technician.

Impact Results

The team performed an impact assessment for the HEP and ESHP programs. For the HEP program, the evaluation team incorporated a retrospective assessment of net-to-gross to PY4 given that this program has not calculated an Illinois-specific net-to-gross ratio (NTGR) in past evaluation efforts. The net-to-gross values were collected through responses from a net-to-gross battery of questions in the participant survey to determine a program-level NTGR along with end-use or measure-level NTGRs, where possible.

For the ESHP program, we used the HEP measure-level NTGRs and applied them to the ex post gross savings. During the evaluation-planning phase, AIC, ICC staff, and the evaluation team discussed and agreed upon employing a program-level NTGR of 0.80 to the ESHP program. Subsequently, we applied the HEP NTGRs given our understanding of the consistency of program design and implementation of the HEP and ESHP programs. Additionally, we applied the HEP spillover percents to the ex post gross savings to determine a final program-level electricity savings NTGR.

Table **17** below provides a summary of HEP program net energy impacts. Note that because spillover values differ across energy and demand savings, the NTGRs for therms, MW, and MWh are not equivalent.

Table 17. Summary of HEP Program Net Energy Impacts

Impacts	MW	NTGR	MWh	NTGR	Therm	NTGR
Ex Ante Net Impact ^a	N/A ^b	N/A	1,491	0.80	625,749	0.89
Ex Post Net Impact	0.43	0.98	1,753	0.92	596,680	0.81
Net Realization Rate	N/A		1.18		0.95	

^a Ex ante NTGRs were derived from the CSG database. Ex post NTGRs vary between therms, kW, MW, and MWh for HEP due to spillover.

^b Conservation Services Group (CSG), the implementer, is not required to track demand savings.
Note: Net Realization Rate = Ex Post Net Value / Ex Ante Net Value.

Table 18 provides a summary of ESHP program net energy impacts.

Table 18. Summary of ESHP Program Net Energy Impacts

Impacts	MW	NTGR	MWh	NTGR	Therm	NTGR
Ex Ante Net Impact ^a	N/A ^b	N/A	223	0.89	731	0.99
Ex Post Net Impact	0.038	1.01	222	0.92	628	0.80
Net Realization Rate	N/A		1.00		0.86	

^a Ex ante net-to-gross ratios were derived from the CSG database.

^b Conservation Services Group (CSG), the implementer, is not required to track demand savings.
Note: Net Realization Rate = Ex Post Net Value / Ex Ante Net Value.

Process Results

Based on discussions with AIC staff, HEP program allies, and program participants, key findings include:

- **Program participation partially increased with a corresponding increase in program staffing.** In PY4, the program increased the number of participants from PY3, particularly retrofit-only projects. The HEP and ESHP programs recruited 4,627 participants. Notably, the percent of projects that are “non-audit” (i.e., retrofit only) has grown over time in response to PY3 evaluation recommendations. Other contributing factors may include changes in incentive levels and growth in the program ally network.
- **Participants are satisfied with program components, staff, and measures installed.** Based upon participant responses, 86% of HEP and 84% of ESHP respondents were satisfied with the program overall (providing a score of 8 to 10 on a scale of 0 to 10, where 0 is “dissatisfied” and 10 is “satisfied”). Respondents were most satisfied with the quality of work completed and the time it took to complete the audit. HEP program participants were less satisfied with the audit report in providing a framework to understand the home’s overall energy usage. ESHP program participants were less satisfied with the amount of time between when they were called to schedule the audit and when the audit was completed.
- **PY4 marks a substantial increase in program staff and allies.** In PY4, the program substantially increased the number of program staff that provide services across AIC territory (increased staff levels from 6 in PY3 to 18 in PY4). In addition, the program conducted more recruitment of contractors, with the number of contractors increasing from 40 to 69 from PY3 to PY4. Efforts were directed toward increasing

staff and program allies in southern Illinois in an attempt to support market transformation of available contractors within the state.

- **The program increased the conversion rate from PY3.** The HEP program conversion rate (i.e., those who completed an audit and then continued to install retrofit measures in their homes) is 10%.⁵ The conversion rate increased from 6% in PY3 to 10% in PY4.

Recommendations

- **Consider increasing marketing and outreach efforts, particularly targeting efforts.** The ESHP pilot is a targeted approach to achieving higher electricity savings. The HEP program can also consider additional ways to target customers to achieve electricity savings.
 - **Continue to leverage existing targeting efforts.** The HEP and ESHP program implementers are doing a good job of identifying target customers for the programs through using customer usage data from AIC and past audit participation trends to stratify customers by expected probability of response based upon heating and cooling loads, age of home, size of home, income range, number of residents, and other factors.
- **Consider opportunities to improve the conversion rate for both HEP and ESHP.**
 - **Consider following-up with phone calls and/or mailers to those participants who have not followed-up with program allies after six months.** Program staff could consider following-up with audit-only customers six months after the audit to remind them of the incentive measures.

⁵ Note that this conversion rate only includes customers that completed HEP measures after the audit. It does not include customers that participated in other programs (e.g., HVAC) after the audit. It also does not include households that were audited during PY3 but did not install shell measures until PY4 (if these were not provided in the program-tracking database extract provided to the evaluation team).

3.8 RESIDENTIAL MODERATE INCOME

The Residential Moderate Income program or “Warm Neighbors Cool Friends” (WNCF) program began in PY3 as a pilot program. During PY4, AIC launched WNCF as a formal program, as part of the Home Energy Performance (HEP) program, and expanded the geographic areas where services were offered. More specifically, the program expanded from the Decatur area to the Peoria tri-county area, the St. Louis Metro East area, and the Quincy-Macomb area.

Implemented by Conservation Services Group (CSG), the program performs no-cost energy audits for targeted customers, who are referred to CSG by the Energy Assistance Foundation (EAF), a nonprofit organization funded through donations by AIC employees and customers. The EAF is also a key contributor of program funds. In particular, the program requires customers to pay a small portion of the overall project cost (the greater of \$500 or 10% of the total project cost, in addition to any amount not covered by program incentives). EAF grants then fund up to \$3,000 to cover the remainder of the project cost after program incentives are applied.

The involvement of the EAF in participant intake and outreach is also of note in that it differentiates the WNCF program from other home performance offerings. In particular, customers who are interested in participating in the program submit their application to EAF, which screens the customers for income eligibility. If the customers are eligible, EAF then passes on this information to CSG to schedule an appointment.

Once a participant enters the program, several measures are installed at the time of the on-site consultation. These measures include CFLs and/or water conservation savings measures. Homeowners then receive a custom report with a work order of recommended energy efficiency improvements that they are encouraged to install by contracting with CSG, in addition to actions they can perform themselves. CSG then subcontracts the work to be performed to select HEP and HVAC allies.

Impact Results

The team performed an impact assessment for the WNCF program. Overall, the WNCF program achieved 286 MWh, 0.26 MW, and 110,908 therms in PY4 (see Table 19). Based on the program design and discussions with both AIC and ICC staff, the evaluation team applied a net-to-gross ratio (NTGR) of 1. This is due to the fact that the program is only provided to qualified participants who fall within 200% and 300% of the federal poverty level guidelines for household size and otherwise need grant funds to cover the costs of the measures. As such, the program participants are unlikely to have installed many of the measures offered through the program without assistance. As a result, ex post gross impacts and ex post net impacts are identical.

Table 19. Summary of WNCF Program Net Energy Impacts

Program	Ex Ante Net Impacts			Ex Post Net Impacts		
	MW ^a	MWh	Therm	MW	MWh	Therm
Moderate Income	–	288	110,434	0.259	286	110,908
Net Realization Rate				N/A	0.99	1.00

^a Conservation Services Group (CSG), the implementer, is not required to track demand savings.

Note: Net Realization Rate = Ex Post Value / Ex Ante Value.

Process Results

The process evaluation findings are summarized below.

- **Participants are very satisfied with the program.** Responses from surveyed participants indicate a high degree of satisfaction with various components of the program, including the professionalism and services offered by Energy Advisors, as well as other program components (e.g., on-site consultation reports, time it took to schedule, measures installed, etc.). However, opportunities exist to improve satisfaction with the work conducted as well as the amount of time taken to schedule a consultation from receipt of application.
- **There were early challenges in recruiting participants across geographic areas.** The program encountered some early challenges regarding program participation and uptake across the four geographic areas served. We note, however, that program rollout to each area was staggered over the program year, and not all areas had 12 months to recruit participants.

3.9 RESIDENTIAL ENERGY STAR® NEW HOMES

The Residential ENERGY STAR® New Homes program targets builders using a package of services, including training, technical information, and marketing assistance and incentives for construction of ENERGY STAR new homes (homes with a HERS Index of 85 or lower). CSG implements the program for AIC.

The Residential Energy Services Network (RESNET) created the HERS Index scoring system, which rates homes built to the HERS Reference Home specifications on a HERS Index score of 100.⁶ A lower HERS Index score indicates higher energy efficiency. Each one-point decrease in the HERS Index corresponds to a 1% reduction in energy consumption, compared to the HERS Reference Home. Thus, a home with an 85 HERS Index would be 15% more energy efficient than the HERS Reference Home, and a home with an 80 HERS Index would be 20% more energy efficient. AIC's ENERGY STAR New Homes incentive seeks to defray the additional costs associated with building more efficient homes. The program also provides cooperative marketing support to builders.

The program targets builders of new single- and multifamily homes, heated with a fuel (natural gas or electricity) provided by AIC. In PY4, the program introduced a tiered incentive structure so builders could qualify for additional financial incentives by achieving higher efficiency levels in their new homes. The tiers are:

- For a home with a 71 to 85 HERS rating, builders receive \$450 for a gas-only home, and \$750 for a gas and electric home or electric-only home.
- For a 56 to 70 HERS rating, bonuses double: \$900 for gas, and \$1,500 for gas and electric or just electric.
- For homes with a HERS rating of 55 or less, bonuses triple: \$1,350 for gas, and \$2,250 for gas and electric or just electric.

Incentives offered under the first tier have been designed to cover the costs builders incur in having homes rated. Further incentives contribute to covering the costs of time spent installing more expensive measures.

AIC and CSG recruit builders and HERS raters to participate in the program. HERS raters also recruit builders. AIC, CSG, HERS raters, and builders all promote the program to customers interested in building new homes. Builders must work with raters, providing building plans for raters to review and assign an initial (plan-based) rating. Once an initial rating has been established, CSG approves the home and reserves incentive funding. The HERS rater inspects the home during construction and then creates an energy analysis model (REM/Rate™ model) to estimate the home's energy savings. CSG pays the builder based on the home's actual rating once it has been completed.

Impact Results

The evaluation team verified program participants and savings estimates by reviewing energy analysis model runs for a random sample of participating homes in the tracking database. We verified that the model runs were consistent with identifying information in the tracking database, and that savings matched the model run outputs. All projects reviewed verified the information in the

⁶ A net-zero energy home scores a HERS Index of 0. The HERS Reference Home has been based on the 2006 International Energy Conservation Code ISBN-13.978-1-58001-270-6.

tracking database. Table 20 applies these results to the project population, showing 100% verification.

Table 20. Summary of Program Verification Results

Measure	Units	Program Participation	Verified Participants	Verification Rate
E-STAR Home: combo, HERS 71–85	Per Home	4	4	100%
E-STAR Home: gas, HERS 56–70	Per Home	16	16	100%
E-STAR Home: combo, HERS 56–70	Per Home	32	32	100%
E-STAR Home: electric, HERS 56–70	Per Home	2	2	100%
E-STAR Home: combo, HERS ≤55	Per Home	5	5	100%
E-STAR Home: electric, HERS ≤55	Per Home	6	6	100%
Total		65	65	100%

The evaluation team applied fixed per-unit savings for each participant based on their HERS rating level, and summed those savings from the tracking database. We then applied a deemed 0.8 net-to-gross ratio (NTGR) to estimate net savings. As shown in Table 21, ex ante and ex post net savings are the same.

Table 21. PY4 ENERGY STAR New Homes Program Net Impacts

Program Measure	PY4 Ex Ante Net Impacts			PY4 Ex Post Net Impacts		
	MW	MWh	Therms	MW	MWh	Therms
ESNH Total	0.072	189	12,800	0.072	189	12,800
<i>Net Realization Rate</i>				<i>1.00</i>	<i>1.00</i>	<i>1.00</i>

Note: Realization Rate = Ex Post Net Value / Ex Ante Net Value.

Process Results

Participating homes had an average HERS rating of 60 (ranging from 38 to 78), and all were below the minimum 85 HERS level. This low average indicates that builders went beyond the program's minimum requirements. Program homes also tended to be larger homes, with a mean home size of 3,700 square feet.

As a mature program, AIC's ENERGY STAR New Homes program has developed a consistent group of trade ally partners and efficient processes. Program staff believe the number of trade allies to be adequate for the program's size.

Based on the PY4 evaluation, the team provides the following recommendations:

- **Increase targeted marketing.** Because market penetration remains lower than AIC would like, the utility should increase its targeted marketing efforts. The evaluation team recommends engaging builders in focus groups or discussions so they can help AIC identify the best marketing avenues. AIC might use participating builders' names in targeted advertising, offer cooperative advertising funds to builders, or involve builders in creating the advertising message. Because customers seem to be more motivated by saving money than by saving energy, marketing messages should focus on economics.

- **Assist HERS raters in becoming better communicators.** Because HERS raters play a central role in the program, the relationship between raters and builders is critical. HERS raters recruit builders and educate them about energy efficiency options. They also process all paperwork. AIC and CSG should first look for opportunities to simplify the paperwork, and then encourage HERS raters to prioritize paperwork, using financial incentives. Additional training on when and how to communicate with builders may also prove helpful.
- **Provide support for the transition to ES 3.0.** As the program transitions to ENERGY STAR 3.0, program staff need to consider approaches to facilitate that transition, such as actively training builders on the new program checklists, and training raters on the new paperwork.

3.10 C&I STANDARD PROGRAM

The Commercial & Industrial (C&I) Standard program offers AIC business customers fixed incentives for the installation of specific energy efficiency measures. The program covers lighting, variable frequency drives (VFDs), HVAC, refrigeration/grocery equipment, and motors. In addition, the program includes an online store available to all business customers that offers a variety of energy-saving products, including Compact Fluorescent Lamps (CFLs), exit signs, and vending misers in a convenient and easy-to-use delivery mechanism. In addition, the program features two additional offerings:

- **Green Nozzle Program:** Beginning in PY4, the free green nozzles provided through this program effort were available to all AIC gas customers, as well as customers in the food service sector who use electric water heating.⁷ The goal of this effort is to replace less flow-efficient nozzles with low-flow green nozzles to reduce the therms associated with water heating. The effort targets eligible AIC restaurants, commercial kitchens, bar and grills, and other locations that perform food service/food preparation activities.
- **Direct Installation Initiative:** This initiative began as a PY3 pilot program to install faucet aerators and low-flow showerheads in facilities that previously received a green nozzle as part of the Green Nozzle program, as well as hotels, motels, or restaurant facilities that belong to the GDS-2 rate class. In PY4, it expanded to electric customers and gas customers in the GDS-2 through GDS-4 rate classes, and offered a wider range of energy-saving products, including CFLs.

Overall, AIC designed and continues to modify the C&I Standard program to overcome barriers related to cost, awareness/information, and resistance to the adoption of new, more energy-efficient technologies. The incentives offered by the program address the cost of energy efficiency improvements; the recruitment of program allies; the establishment of a formal program ally network; and the development of program materials, including applications that are easy to understand and complete, which help overcome the awareness and information barrier. Further, those involved in program implementation use case studies, press releases, training sessions, and webinars as mechanisms to convince potential participants of the benefits associated with removing inefficient equipment even if it is still functional.

Impact Results

Overall, our participant verification activities demonstrated that AIC is accurately tracking what is installed and operating due to the program. As shown in Table 22, the Online Store component had the lowest verification rate due mainly to the distribution of free lighting kits containing 4 CFLs and 2 LEDs. The team's research with these participants indicated that kit recipients had not installed a large portion of the bulbs mainly because they did not feel they were needed yet.⁸

⁷ The Green Nozzle Program began in PY2.

⁸ The team will give AIC credit for savings associated with the installation of these bulbs in subsequent program years.

Table 22. C&I Standard Program Verification Results

Program Component	Program Tracking	Verified Participation	Verification Rate	Method
Core Program	2,553	2,541	100%	Participant Survey & Site Visits
Online Store	161,507	103,215	64%	Participant Survey & Database Review
Green Nozzle	902	817	91%	Participant Survey
Direct Install	18,678	18,678	100%	Database Review

Table 23 provides the PY4 C&I Standard program net impacts. In developing estimates of net savings, the team applied the PY2 net-to-gross ratios (NTGRs) for all of the program's components. Overall, the PY4 C&I Standard program achieved 92,811 MWh in net electric savings and 1,560,266 therms in net gas savings. This level of savings enabled the program to exceed both its PY4 electric and gas goals.

Table 23. C&I Standard Program Net Impacts

Program Component	Ex Ante Net			Ex Post Net		
	MWh	MW	Therms	MWh	MW	Therms
Core Program	50,847	10	405,994	51,454	11	458,325
Online Store	49,244	--	--	37,053	--	--
Direct Install	508	--	290,985	508	--	290,985
Green Nozzle	4,171	--	900,032	3,796	--	810,956
Total	104,770	10	1,597,011	92,811	11	1,560,266
	<i>Net Realization Rate</i>			0.89	1.01	0.98

Process Results

According to program staff, the C&I Standard program ran smoothly in PY4 and benefitted from the addition of staff resources to the marketing team. While program marketing was strong in prior program years despite a shortage of human resources, PY4 staffing changes have helped to alleviate previous staffing constraints caused by the need for staff in various roles across the program to assist with outreach activities.

Findings from our research with participating contractors also indicate that satisfaction with the program remains relatively high, and that services provided by the Program Ally Network are generally valued by registered contractors. One potential exception is program-sponsored roundtables, which 21% of registered contractors said they saw as the least valuable service provided by the program when asked about a list of specific services.⁹ Based on this feedback, program staff may want to collect additional data on this service in their annual Program Ally survey or through evaluation forms filled out by event participants.

⁹ The team asked this question (P11) of all survey respondents and not just those who had taken advantage of each service listed. Due to survey length, we did not have an opportunity to gather feedback on potential improvements to specific services.

Based on the team's PY4 evaluation activities, we make the following recommendations for the program:

- **Update the assumed in-service rate for green nozzles.** The program should assume a removal rate of at least 10% (an overall installation rate of 90%) for the green nozzles distributed through the C&I Standard program. Research on this offering in PY2 found similar rates of installation, and as a result the program included an installation rate of 82% in its PY3 tracking data.
- **Educate free lighting kit recipients about bulb replacement options.** Research with recipients of the PY4 free lighting kit indicates that many AIC customers request the kits but hesitate to install the new bulbs in place of existing ones. As a result, while AIC held an LED webinar for customers in May 2012, program staff should also consider developing literature to accompany the bulbs to explain the benefits of replacing incandescent bulbs with CFLs or LEDs even if the existing bulbs are still operational. Additional information on LEDs and their use in commercial applications may also be helpful to customers given that a small number of survey respondents noted that they were unsure where to install LEDs or what the best application was for their business.

3.11 C&I CUSTOM PROGRAM

The C&I Custom program allows AIC business customers to complete energy efficiency projects that involve the installation of equipment not covered through the C&I Standard program. The availability of this program option allows customers to propose additional measures and tailor projects to their facility and equipment needs. In general, C&I Custom incentives are available for lighting, HVAC, refrigeration, and motors. Participants can also implement projects involving compressed air, drives, energy management systems, and industrial process measures.

Consistent with prior years, the PY4 C&I Custom program serves as a channel for the submission of New Construction projects, which have been limited in number over the past three program years. Beginning in PY4, AIC business customers could also install gas measures through the program. Key gas measures include heat recovery, building shell, and process heat and steam system upgrades. Further, AIC introduced Energy Advisors and other outreach staff to recruit potential participants to the program, as well as a Staffing Grant initiative to ensure that interested customers have the resources to implement projects.

The Staffing Grant offering launched in PY4 provides customers with additional funding to help address resource constraints and staff needs to aid in the implementation of energy efficiency projects. As part of the application process, customers must outline a set of proposed projects. Funds are ultimately distributed based on the proportion of proposed savings achieved.

Overall, AIC designed and continues to modify the C&I Custom program to overcome barriers to participation, such as program awareness, a difficult application process, and corporate uncertainty. The company has taken specific steps to address these barriers in recent years, including launching varied and innovative promotional offers such as the Early Completion Bonus and the Competitive Large Project Incentive (CLPI) initiative, as well as simplifying the application form and providing access to program staff during the project development phase.

Impact Results

Overall, the PY4 C&I Custom program reached 127 customers and achieved 47,837 MWh in net electric savings and 561,784 therms in net gas savings. These results demonstrate significant program growth over PY3, when the program achieved 30,341 MWh (158% increase).

Table 24. C&I Custom Program Net Energy Impacts

Program	Ex Ante Net Impacts			Ex Post Net Impacts		
	MW	MWh	Therms	MW	MWh	Therms
Custom	6.20	46,644	541,838	5.98	47,837	561,784
Net Realization Rate				0.96	1.00	1.04

Per the Illinois net-to-gross (NTG) framework, the PY4 results are based on the team's application of the PY2 net-to-gross ratio (NTGR) for the majority of C&I Custom projects. In addition, we developed NTGRs for the six Staffing Grant participants interviewed as part of the evaluation, and applied their individual NTGRs on a retrospective basis.

Process Results

According to program staff, the C&I Custom program ran smoothly in PY4 and benefitted from the addition of staff resources to the marketing team. While program marketing was strong in prior program years despite a shortage of human resources, PY4 staffing changes have helped to alleviate previous staffing constraints caused by the need for staff in various roles across the program to assist with outreach activities.

Findings from our research with participating contractors also indicate that satisfaction with the program remains relatively high, and that services provided by the Program Ally Network are generally valued by registered contractors. One potential exception is program-sponsored roundtables, which 21% of registered contractors said they saw as the least valuable service provided by the program when asked about a list of specific services.¹⁰ Based on this feedback, program staff may want to collect additional data on this service as part of their annual Program Ally survey or through evaluation forms filled out by event participants.

Further, we found that AIC's new Staffing Grant initiative is operating consistent with its design. In particular, participants used the grant money they received from the program to reassign internal staff to manage energy efficiency projects, hire external project managers or engineers, or consult with industry experts to identify potential areas for energy savings.

Based on the team's PY4 evaluation activities, we make the following recommendations for the program:

- **Continue the Staffing Grant program offering.** Interviews with grant recipients and a review of grant applications illustrate both the need for this additional program incentive in overcoming barriers related to staff resources and expertise, and the effective implementation of the offering. Pending the availability of program funds, the team recommends the continuation of this incentive as a way to encourage greater participation in all of the AIC business programs.
- **Explore the feasibility of providing technical assistance.** While the majority of Staffing Grant participants we spoke with did not encounter any problems with the C&I Custom program application process, those participants from smaller businesses and organizations did report challenges with the process. While program staff have already demonstrated a commitment to meeting one-on-one with potential participants, and have hired a dedicated staff person to assist large commercial customers, the program should continue its current efforts to evaluate the ways in which they might be able to support smaller customers. In addition to training and program process changes already under consideration, one option could be the development of a participation guide for these customers, which could explain what resources are available for help with savings calculations or project specifications (related to the program or external sources), and whom to contact if they have questions.¹¹

¹⁰ The team asked this question (P11) of all survey respondents and not just those who had taken advantage of each service listed. Due to survey length, we did not have an opportunity to gather feedback on potential improvements to specific services.

¹¹ The team understands that program staff are implementing training in energy management, as well as streamlining program applications.

3.12 C&I RETRO-COMMISSIONING PROGRAM

The Act On Energy C&I Retro-Commissioning program helps customers evaluate their existing mechanical equipment, energy management, and industrial compressed air systems to identify no-cost and low-cost efficiency measures to optimize energy systems. Customers contract with pre-approved Retro-Commissioning Service Providers (RSPs) to perform an energy survey, resulting in a written report detailing the savings opportunities. Following verified implementation of measures with a payback of less than 12 months, AIC pays a survey incentive based on the project type that covers 50% to 80% of the survey cost. A further implementation incentive is paid to the customer based on the energy saved, and a bonus is paid to the contractor based on timely measure implementation and energy saved.

In prior years, the program only served the industrial compressed air and healthcare market segments. These two segments still represent the majority of projects and savings, but the program now has a commercial building component and piloted an ammonia refrigeration system optimization project under the C&I Retro-Commissioning program. Further, the program introduced a new and complementary program, the Leak Survey and Repair program, which services customers with smaller compressed air systems. For PY4, Ameren Illinois Company (AIC) planned to garner 8% of the portfolio's electric energy savings and 2% of the portfolio's therm savings from this program.

Impact Results

Table 25 summarizes reported and verified program participation by the different program components. As seen in this table, during PY4 AIC included 31 electric and 5 gas facilities as participants and paid them incentives from the C&I Retro-Commissioning program. One compressed air project's savings depended on a custom incentive project completion that did not occur until shortly after PY5 began. After discussions among AIC staff, the implementation team, ICC staff, and the evaluation team, we chose to drop this site from our PY4 analysis and analyze this participant in PY5.¹²

¹² AIC will count savings for both the C&I Custom and C&I Retro-Commissioning projects in PY5, though the incentive cost for the C&I Retro-Commissioning project is included in PY4 costs.

Table 25. Summary of Program Verification Results

Program Component	Program Participation (N)		Verified Participants (N)		Realization Rate	
	Electric	Natural Gas	Electric	Natural Gas	Electric	Natural Gas
Ammonia Refrigeration Projects	1	0	1	0	100%	N/A
Compressed Air Projects	19	0	18	0	95%	N/A
Leak Survey and Repair	7	0	7	0	100%	N/A
Healthcare Retro-Commissioning ^a	3	4	3	4	100%	100%
Commercial Building Retro-Commissioning	1		1		100%	
All Projects	31	5	30	5	97%	100%

^a One Healthcare project included only natural gas measures since the customer does not receive electricity service from AIC.

The evaluation team performed an engineering review of 15 of the 31 projects (including four of five natural gas sites) to obtain a gross realization rate for the program. The evaluation team performed NTG analysis in PY4 for application to the program retrospectively¹³ in PY4. The NTGR, based on participant and RSP self-report data, is 0.95 for both fuels.

We modified the program ex ante gross savings for several reasons, although ultimately the gross realization rates were relatively high (0.89 electric energy, 0.91 demand, and 0.85 therms). Conversely, the PY4 NTG research revised the NTGR upwards; thus, ex post net savings are moderately higher than ex ante net savings. Table 26 summarizes PY4 net impacts.

Table 26. PY4 C&I Retro-Commissioning Net Impacts

Program	Ex Ante Net Impacts ^a			Ex Post Net Impacts ^b		
	MW	MWh	Therm	MW	MWh	Therm
Retro-Cx	1.997	16,175	360,693	2.143	17,052	361,966
<i>Net Realization Rate</i>				<i>1.07</i>	<i>1.05</i>	<i>1.00</i>

^a Ex ante net savings use an NTGR of 0.80 for both fuels, based on "dashboard" spreadsheets.

^b Ex post net savings use an NTGR of 0.95 for both electric and gas.

Process Results

The PY4 evaluation plan for the C&I Retro-Commissioning program did not call for a formal process evaluation of the program. Process questions will be the focus of the evaluation effort in PY5. Nonetheless, the evaluators noted some process-related observations based on our background research and answers to open-ended questions posed to participants and service providers during the NTG surveys.

¹³ Retrospective application of the PY4 net-to-gross ratio (NTGR) estimate is based on the interpretation of the memo: Proposed Framework for Counting Net Savings in Illinois, Optimal Energy, March 12, 2010. AIC assumed NTGR=0.8 for planning purposes not as a result of prior NTGR research.

- Service providers unanimously agreed they liked the program and would continue to participate as RSPs. A sample quote: “This program is great for Illinois businesses.”
- Other aspects of program marketing and technical support from the program implementer (SAIC) also received generally positive feedback.
- Respondents offered less positive comments about other program processes. Several service providers noted the cumbersome and shifting processes for participation. One RSP noted that the new program year was announced in May for a June 1 launch, but applications were not available until mid-July and revisions continued into September. W-9 requirements were added later, and incentives and bonuses seemed to change throughout the program year.

Two key findings from our PY4 effort fall into the process category. Based on our engineering review of the projects:

- Project reports are inconsistent in content and analysis. This can lead to unwarranted reduction of savings if the evaluation team cannot find the most appropriate information.
 - Consider issuing a template report with prescribed sections and elements of data and analysis required for each section. This would encourage more standardization among reports to include critical data and organization that facilitate internal program review and evaluation, and may reduce our missing critical information.
- Ex ante savings calculations are often not included in reports, or simulation inputs are not detailed. The evaluation effort was greater due to the need to reproduce calculations from scratch to confirm approximate savings estimates. Similar to the inconsistent reports, this may also lead to reduction of savings that could be avoided.
 - Consider encouraging RSPs to use more transparent calculations like spreadsheets or, at a minimum, include electronic input files for simulations when they are used for estimating savings. Require submitting electronic versions of calculations to assure that we understand how the RSPs obtain results. Consider issuing template calculators for common measures to ensure consistent approaches and the use of default parameters among service providers.

A. PY4 PROGRAM EVALUATION REPORTS



Final AIC PY4
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B. COMMISSION GUIDANCE ON EVALUATION EFFORTS

The ICC Order for Docket 10-0568 dated December 21, 2010, provides significant information about how the evaluation team should use NTGRs and per-unit values, which ones the team should include in its reports, and when per-unit values will be updated. This information is described in the Three-Year Plan, but we provide it here for reference as well.

Key points directly taken from the ICC documents are:

- The Order has a set of fixed per-unit savings values that evaluators are to report in our PY4 evaluation for most measures.¹⁴ For measures without a fixed value, we plan to perform an engineering analysis.
- AIC must apply any updated per-unit values received by March 1 to the next program year (Lines 505-508 of AIC Exhibit 10.0 in the December Order). As evaluation results are generally available in the fall, the earliest application of any results from the evaluation of standard measures will skip a program year. For example, PY4 results are available for application in PY6, and PY5 results are available for application in PY7.
- AIC must work with other utilities and the Stakeholder Advisory Group “to develop a Statewide TRM for use in the upcoming energy efficiency Three-Year Plan” (p.19 Order on Rehearing). Since this document is dated prior to the beginning of PY4, we assume this means PY4-PY6 (i.e., Plan 2).
 - The Statewide TRM consultant is currently working on high-impact measures and then will turn its attention to all the other measures in the portfolio. A draft of the Statewide TRM with values may be available prior to March 1, 2012, but more likely, the final values will not be available until after March 1. Following the timeline from the Order, that would mean that per-unit values should be applied to PY6. We will default to this assumption unless otherwise agreed to in writing with AIC or the ICC Staff.¹⁵
- The Final Order and Order on Rehearing also provided a framework on how and when to apply NTGRs as well as when any update to NTGRs should be applied. This framework is provided below, verbatim from the Order:
 1. Where a program design and its delivery methods are relatively stable over time, and an Illinois evaluation of that program has an estimated NTG ratio, that ratio can be used prospectively until a new evaluation estimates a new NTG ratio.
 2. In cases that fall under the paragraph above, once new evaluation results exists, these would be used going forward, to be applied in subsequent program years following their determination until the next evaluation, and so on.

¹⁴ Updated fixed values for standard measure savings were filed in the Plan 2 docket 10-0568 on December 9, 2011.

¹⁵ We have heard in the ongoing Statewide TRM meetings that ComEd expects to implement some or all of the Statewide TRM measures in PY5. This choice does not follow the timeline in the AIC Exhibit 10.0, although AIC has chosen to follow the same timeline and use Statewide TRM values in PY5.

3. For existing and new programs not yet evaluated, and previously evaluated programs undergoing significant changes—either in the program design or delivery, or changes in the market itself—NTG ratios established through evaluations would be used retroactively, but could also then be use prospectively if the program does not undergo continued significant changes, similar to the first paragraph above.
4. For programs falling under the third paragraph above, deeming a NTG ratio prospectively may be appropriate if: the program design and market are understood well enough to estimate with reasonable accuracy an initial NTG (e.g., based on evaluated programs elsewhere); or it is determined that the savings and benefits of the program are not sufficient to devote the evaluation resources necessary to better estimate a NTG ratio.¹⁶

Based on the language above, we have created a three-point set of rules to follow.

1. If the program design and delivery methods are stable over time and a previous Illinois evaluation has estimated a NTGR, that NTGR is used prospectively until a new value is calculated. When the new value is calculated, we will apply the value prospectively following a similar timeline as the per-unit values. For example, if a PY4 NTGR is calculated for a program that has had an evaluation and the program and market are stable, we will apply the new NTGR in PY6.
2. For existing programs that have been evaluated previously but are undergoing significant changes in program design or in the market served by that program, or for existing and new programs that have not yet had an evaluation, an NTGR will be calculated and applied retroactively (i.e., for the year in which program participants are included in the research).
3. If a previous Illinois evaluation has not occurred, it is possible to deem an NTGR based on secondary research showing other NTGR values from similar programs. This approach is used in two cases:
 - a. If the program design and market are well understood
 - b. If the savings of the program are not sufficient to devote evaluation resources

These rules have helped to shape choices made in the evaluation of the portfolio.

¹⁶ The Order further states: “Recommendations of the SAG to the Commission regarding application of this framework shall be submitted with adequate time for Commission review. If the SAG is not in unanimous agreement in its recommendation, the Commission requests that any recommendation that has the support of more than a majority of SAG members be submitted to the Commission along with a discussion and enumeration of the dissenting opinions.” Docket No. 10-0568, Final Order at 72, December 21, 2010.